

**Patent Claims**

*What is claimed is:*

1. A generally cylindrical expandable shaft having an outer profile, said shaft comprising:  
a generally cylindrical inner body having a longitudinal axis and at least one first coupling element;  
at least two semi-circular leaf elements being movably coupled to said first coupling element of said inner body by means of at least one second coupling element, said leaf elements together substantially forming said outer profile of said generally cylindrical expandable shaft; and  
at least one thrusting element being operatively disposed between said leaf elements and said inner body to move said leaf elements radially outwards relative to said longitudinal axis to increase an outer diameter of said shaft when in a first configuration and allow said leaf elements to move radially inwards relative to said longitudinal axis to decrease said outer diameter of said shaft when in a second configuration.
2. A shaft according to claim 1, wherein said leaf elements being resiliently biased radially inwards by means of a spring disposed between said inner body and said leaf elements.
3. A shaft according to claim 2, wherein said spring being one of a leaf, wave and coil spring.
4. A shaft according to claim 1, wherein said first and second coupling elements being complementary hooks.
5. A shaft according to claim 4, further comprising two first and two second coupling elements.
6. A shaft according to claim 1, further comprising three semi-circular leaf elements.

7. A shaft according to claim 1, wherein said leaf elements including a plurality of knurls on an outer surface for increasing friction of engagement with a core of a product to be gripped.

8. A shaft according to claim 1, further comprising an air journal removably coupled with said inner body and including an intake opening for permitting air to be supplied to said thrusting element for moving said leaf elements to said first configuration.

9. A shaft according to claim 8, wherein said air journal further including an exit opening for permitting air to be removed from said thrusting element for moving said leaf elements to said second configuration.

10. A shaft according to claim 8, wherein said air journal further including at least one of a keyed and a slotted locking member engageable with said inner body for imparting rotational torque transmission to said shaft.

11. A shaft according to claim 8, wherein said air journal further including at least one of a keyed and a slotted locking member engageable with a journal end connectable to a drive unit for driving said shaft for imparting rotational torque transmission to said shaft.

12. An expansible shaft having an outer profile, said shaft comprising: /  
an inner body having a longitudinal axis and at least one first coupling element;  
at least two leaf elements being movably coupled to said first coupling element of said inner body by means of at least one second coupling element, said leaf elements together substantially forming said outer profile of said generally cylindrical expansible shaft; and  
at least one thrusting element being operatively disposed between said leaf elements and said inner body to move said leaf elements radially outwards relative to said longitudinal axis to increase an outer surface area of said shaft when in a first configuration and allow said leaf elements to move radially inwards relative to said longitudinal axis to decrease said outer surface area of said shaft when in a second configuration.

13. A shaft according to claim 12, wherein said leaf elements being resiliently biased radially inwards by means of a spring disposed between said inner body and said leaf elements.
14. A shaft according to claim 13, wherein said spring being one of a leaf, wave and coil spring.
15. A shaft according to claim 12, wherein said first and second coupling elements being complementary hooks.
16. A shaft according to claim 12, wherein said leaf elements including a plurality of knurls on an outer surface for increasing friction of engagement with a core of a product to be gripped.
17. A shaft according to claim 12, further comprising an air journal removably coupled with said inner body and including an intake opening for permitting air to be supplied to said thrusting element for moving said leaf elements to said first configuration.
18. A shaft according to claim 17, wherein said air journal further including an exit opening for permitting air to be removed from said thrusting element for moving said leaf elements to said second configuration.
19. A shaft according to claim 17, wherein said air journal further including at least one of a keyed and a slotted locking member engageable with said inner body for imparting rotational torque transmission to said shaft.
20. A shaft according to claim 17, wherein said air journal further including at least one of a keyed and a slotted locking member engageable with a journal end connectable to a drive unit for driving said shaft for imparting rotational torque transmission to said shaft.